

SOME OBSERVATIONS ON OVERWINTERING OF THE DRONE FLY, *Eristalis tenax* (L.) (SYRPHIDAE)

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In the British Isles, *E. tenax* spends the winter as an adult. The flies enter hibernation in September and October, and reappear the following spring, from the beginning of March onwards.

The present study follows up some observations made by one of us (D. J. S., unpublished), who had occasionally noticed large numbers of *E. tenax* hibernating in caves. Therefore, in an attempt to locate hibernating flies, we visited a number of promising sites, during January and February 1970. The flies were collected and later examined to determine their sex and reproductive status.

Hibernation sites

Overwintering adults of the drone fly, *E. tenax*, were found in sheltered crevices in the rock or stone-work of cave entrances, shelters and some disused "man-made" sites which provided conditions more or less similar to those of a cave:

North Somerset; Caves*, 24 ♀; shelters *, 4 ♀. Anglesey: Maritime cave, 4 ♀. Caernavonshire: Mine tunnels, 4 ♀; stone water tank, 21 ♀.

The hibernation sites were usually damp but otherwise well drained. Frequently, several flies were found clustered together in the same crevice.

Searches were also made on more exposed rocky outcrops and cliffs, and around the entrances to swallow-holes*. All these searches proved unsuccessful. The crevices in exposed situations are probably less suitable as overwintering sites because of frequent flooding during heavy rain.

The terms marked with an asterisk are used here in the following sense:

Cave refers to a more or less horizontal or only slightly descending tunnel. *Shelter* refers to a shallow excavation or cleft, and includes areas of rock sheltered by an overhang. *Swallow-hole* refers to a more or less vertical or very steeply descending tunnel.

Although the flies found hibernating in caves and other situations were all females, there can be little doubt that at least some males also spend the winter as adults, probably in rather

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similar situations Ellis (1937) and Timms (1946), for example, found males and females hibernating together, and our own observations have shown that both sexes are present on flowers in the early spring. Nevertheless, the predominance of females in all the hibernation sites we have studied is of some interest, and clearly requires further investigation.

Fertility of hibernating flies

Dissections showed that the ovaries and basal oocytes of hibernating female flies were small and undeveloped. The spermathecae, however, usually contained sperm. To confirm that hibernating females were fertilised, we kept them in cages in a heated glasshouse. Each cage was provided with pollen and 10 per cent honey. Under these conditions most of the hibernating females soon became active and started feeding. At intervals, flies were removed and dissected in order to follow oocyte development. After a few days the basal oocytes had started to develop, and by the 14th day all the flies examined had mature or nearly mature oocytes in the ovaries. Females laid their first batch of eggs eight to fifteen days after being brought out of hibernation. From the egg batches of five flies, the number of eggs hatching (i.e. fertility) varied from 87.7 to 98.3 per cent with a mean of 93.7 per cent.

It therefore appears that most *E. tenax* females emerging from hibernation in spring are already fertilised. Mating presumably takes place in the early autumn before the flies enter their hibernation quarters. Over the winter, oocyte development must be arrested by a reproductive diapause or in direct response to factors such as low temperature or lack of food. The environmental factors which control hibernation are at present being studied.

References

- ELLIS, E. A. 1937. *Eristalis tenax* hibernating, clustered in a crevice. *Trans. Norfolk Norwich Nat. Soc.*, **14** (2): 189. TIMMS, C. 1946. Hibernation of *Tubifera tenax* L. *Ent. Rec.*, **58**: 39.

A MOVEMENT OF THE MOTH *Hyblaea puera* OFF NICARAGUA

I was interested to read J. C. Felton's note under the above heading (1972, *Entomologist*, **105**: 39-40), as its congeners *H. euryzona* Prout and *H. flavipicta* Hamps. are frequent migrants on the Kenya coast, periodically coming to mercury vapour light in vast numbers. I do not, however, remember ever seeing a migration of *H. puera* Cr. in India, but it would appear that the migratory habit is widespread in the genus.

I notice that Mr Felton refers to the species as a Pyralid. I had always understood it to be a Noctuid and it is so treated by Hampson in the *Fauna of British India*, Moths, ii. — D. G. SEVASTOPULO, Mombasa, 23.iv.72.